

# Let It Flow: Filtering Your Water



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**M**ore and more people I talk to these days have stopped drinking tap water. Some object to the taste and smell of chlorine in city water; others who live in mountain areas served by wells are resigned to cloudy water with high levels of iron or the rotten egg smell of hydrogen sulfide. They tend to think there's nothing they can do, so they switch to bottled water for drinking and cooking, and live with the problem.

Another solution is installation of a home water purification system. This option is rapidly gaining popularity, with increased reports of industrial pollution in urban water supplies, and of the potential health hazards of chlorine and its by-products. According to Michael Lasky of Advanced Water Systems in Capitola, "The worst things in water are tasteless and odorless. People tend to think the water is fine unless they can see or taste a problem."

The processes used to filter and purify water aren't complicated, but there is a wide range of types and combinations of equipment available, and it's important to get one that cleans up the specific problems that concern you. Says Lasky, "The first thing we do is ask people what they are trying to accomplish. Some people just want to get rid of chlorine taste and odor. Some worry more about bacteria."

If you get your water from a municipal source, you probably won't have to worry about bacteria, although some experts say that the eggs of giardia (the backpacker's friend) are not always killed by chlorination. There's also another potential problem with chlorine. Recent studies show it reacts with humic acid (formed by decaying plant matter in water) to form a group of chemicals called THMs (trihalomethanes) one of which is chloroform. The EPA has called THMs "the most ubiquitous synthetic organic chemicals found in drinking water in the U.S." Public systems are required to test for the substances, but there is continuing debate over what levels of THMs are safe.

For those concerned about chlorine, the best filtration systems are of the activated carbon filtration (ACF) type. The water is forced through a network of carbon particles which attracts and absorbs dissolved organic particles in water, including chlorine and THMs. Most of these filtration units are installed at the tap, the "point of use," as opposed to where the water enters your house. Lasky recommends using a two- or three-stage filter, which takes out a lot of sediment



before it can clog the carbon elements of the device. An ACF system can run you anywhere from \$100 to \$350, with replacement carbon cartridges running \$10 to \$60.

One important point: Carbon filtration systems are useful for getting rid of chlorine and sediment, but are not effective for removing many biological contaminants. They should be used only for water that has already been chlorinated. ACF users should also be diligent about replacing exhausted carbon filters—after they load up on pollutants they can start putting them back *into* your water. Lasky says his policy is to recommend filter replacement after only half the life-span set by the manufacturer. For example, if they say it will filter 1,000 gallons, replace it after 500. It should also be noted that letting your ACF go unused for even a few days can make it a breeding place for bacteria.

If you are on a private water system, as are so many people in the area, the best way to find out if your water contains harmful chemicals or minerals is to test it, but that process can often be more expensive than a good filtration system. Testing labs charge a fee for each potential contaminant tested for, and you can end up paying a lot of money to find out what you don't have to worry about. Lasky advises that a full range of tests is so expensive that it makes more sense to go ahead and get a filtration system.

Here are some of the things you might find in your water:

- Particulate matter: Particles of dirt, sand, rust and other sediment. You will be able to see or smell most of these.
- Organic chemicals: Calcium and magnesium carbonates that make water "hard." Nitrates, chemical solvents like TCE, pesticides and PCBs.
- Inorganic chemicals: Includes asbestos and heavy metals such as lead, chromium, mercury.
- Biological pathogens: Bacteria, viruses, and other micro-organisms, such as E. coliform and Giardia lamblia.
- Radiological contaminants: Either occurring naturally or as industrial by-products.

**T**hose on wells may want to consider using a reverse osmosis (RO) filtration system, which removes more than carbon filtration. Most of the RO systems are really a series of three treatment steps. A paper filter removes large

particles from the water, sending it to a reverse osmosis membrane which allows only single water molecules to pass through. A third stage carbon filter removes any remaining particles.

This type of filter does remove micro-organisms, as well as many other contaminants, but it has disadvantages. With a price range of \$450 to \$900, the cost per gallon of pure water is relatively high (but still lower than most bottled water). The RO systems are also slow, producing only between four and 16 gallons a day, and the process used wastes a lot of water; at least two-thirds of what you start with runs off as waste water. In addition, the life spans of the various filters in the system depend greatly on how polluted your water is. For very dirty water, actual capacities will be lower than recommended.

The third and most thorough method of purification is distillation, which uses evaporation to remove impurities from water. This process is also slow, and also generates a huge volume of waste water. Most distillers not only boil and evaporate the water, but also include a "pre-heat" chamber, to get rid of chemicals that vaporize at a lower temperature than water and might otherwise be distilled with it. These units are also expensive, in the \$350 to \$700 range. According to Lasky, one big problem with distillers is the need for constant cleaning to remove sediment built up in the boiling process—check the inside of your tea kettle for an example.

The big debate surrounding the use of distilled water for drinking is whether or not its extreme purity deprives the body of needed minerals. Lasky shrugs, "I could pick up 10 books by 10 experts contradicting 10 other books by 10 other experts."

Confused? Lasky has some advice for those approaching the bewildering world of water filtration. First, he advises, "As soon as you see a system that says it gets rid of 100 percent of anything, you should be suspicious. You just wouldn't believe the outrageous claims being made by some companies." In this relatively new industry, there is little regulation and few legal standards. Lasky and other local filtration companies are pushing for a system of independent third party certification of systems and of claims made in product advertising. He guesses that as many as 90 percent of the companies now in business might disappear if that happens.

## Is Bottled Better?

**F**or those who aren't ready or able to go the home purification route, using bottled water is a good alternative to tap water. Water experts disagree, however, about just how pure bottled water is. Some say the absence of strict state and federal testing programs leaves some bottled water little better than tap water. Most agree that any purification is an improvement.

Water labeled purified or de-ionized has probably been treated by reverse osmosis or de-ionization and will be free of bacteria and most other pollutants. Distilled water has been boiled and condensed to remove just about everything but pure water. (The problem here is that some nutritionists believe distillation also removes some of the minerals necessary to good health.) Bottles labeled drinking water have probably been purified by carbon filtration.

The major disadvantage of bottled water is that much of it is stored in plastic; recent studies show that certain types of plastic actually enter the water and can cause immune system problems. Storing purified water for too long can also allow it to collect bacteria. The best solution is to find water sold (or delivered to your home) in glass, and to buy from an outlet with a relatively fast turnover.

Another purified water solution is taking your own bottle to one of the many machines which dispenses treated water. Again, the quality of the water will depend on how long it's been standing in the machine, and how clean your container is.

— Vicki Bolam